United States Department of Agriculture | Forest Service | Northeastern Area State and Private Forestry | 180 Canfield Street Morgantown, WV 26505-3101

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Mr. Richard Patterson, Director
Northeastern Area State and Private Forestry
Grey Towers National Historic Landmark
ATTN: Elizabeth Hawke, Horticulturist
151 Grey Towers Drive
P.O. Box 188
Milford, PA 18337-0188

Dear Mr. Patterson:

On August 19, 2005, USDA Forest Service personnel conducted a gypsy moth egg mass survey at Grey Towers National Historic Landmark. The purposes of this survey were to determine population densities and assess the potential for defoliation and the need for treatment in 2006. Treatment at Grey Towers had been proposed by site personnel.

Gypsy moth survey plots were randomly selected based upon available host trees (oak species), size of sample area and uniformity between egg mass counts. At each sample point, a 1/40th acre fixed radius plot was established. The plots consisted of a tally of all the new (2005) egg masses observed on the overstory trees, understory vegetation, ground litter and duff. The total number of egg masses observed for each plot was multiplied by 40 to determine the number of egg masses per acre. Egg mass lengths were also measured at the plots to determine the overall "health" of the existing population and as a measure of egg mass fecundity.

The location of the survey plots are shown in Figure 1. The summarized results of the survey are presented in Table 1. Egg mass densities at Grey Towers National Historic Landmark ranged from 40-3880 and averaged 1048 egg masses per acre. Overall egg mass length tended to be moderate to large in size, ranging from 20-40 mm and averaging 32 mm. Egg masses larger than 25 mm typically indicate healthy populations.

The survey results indicate that areas of moderate defoliation (31-60 percent) are likely to occur at Great Towers National Historic Landmark in 2006.

This defoliation prediction is further supported when egg density is also used as a means of estimating gypsy moth population densities. Moore and Jones (1987) found that estimating the mean fecundity would increase the precision of gypsy moth density estimates and that a linear relationship exists between egg mass length and fecundity. Further work by Liebhold et al., (1993) demonstrates that the product of the mean egg mass length (mm) and egg mass density provides a more precise means of estimating population densities and predicting defoliation. Using Liebhold's model, Figure 2 shows how this information can be used to correlate the predicted defoliation of an area. Accordingly, the estimated egg mass density of 1048 egg masses per acre (average egg mass density at Grey Towers x 32 mm (average egg mass length)

translates to a project defoliation level of about 37 percent (moderate defoliation). Because egg mass densities and host type are not evenly distributed, actual defoliation will vary from tree to tree but will be predominately moderate throughout Grey Towers.

In order to prevent this defoliation, we concur with the need for treatment in 2006. The current plan is to have the Pennsylvania Bureau of Forestry incorporate Grey Towers in their suppression program in the spring of 2006. A single application of *Bacillus thuringienis* var. kurstaki (*Btk*) will be applied. With proper timing and good deposition, it is likely that foliage protection and a significant population reduction will be obtained.

Please call me at (304) 285-1555 if you have any questions regarding this egg mass survey or this letter.

Sincerely,

RODNEY L. WHITEMAN
Forester
Forest Health Protection

Cc: Don Eggen, PA BOF
Brad Regester, PA BOF
Noel Schneeberger, AO

Table 1 – Results of the gypsy moth egg mass survey conducted at Grey Towers National Historic Landmark on August 19, 2005.

Plot #	# em/acre
1	3880
2	840
3	280
4	200
5	40
egg masses per acre range = 40-3880 egg masses per acre average = 1048	egg mass size range (mm) = 20-40 egg mass size average (mm) = 32

REFERENCES

Liebhold, A.M., Simons, E.E., Sior, A., and Unger, J.D., 1993. Forecasting defoliation caused by the gypsy moth from field measurements. Environ. Entomol. 22(1): 26-32.

Moore, K.E.B. and Jones, C.G. 1987. Field estimation of fecundity of gypsy moth (Lepidoptera: Lymnatriidae). Environ. Entomol. 16: 165-167.

Figure 1. -- 2005 Gypsy moth survey plot locations at Grey Towers National Historic Site, August 19, 2005.

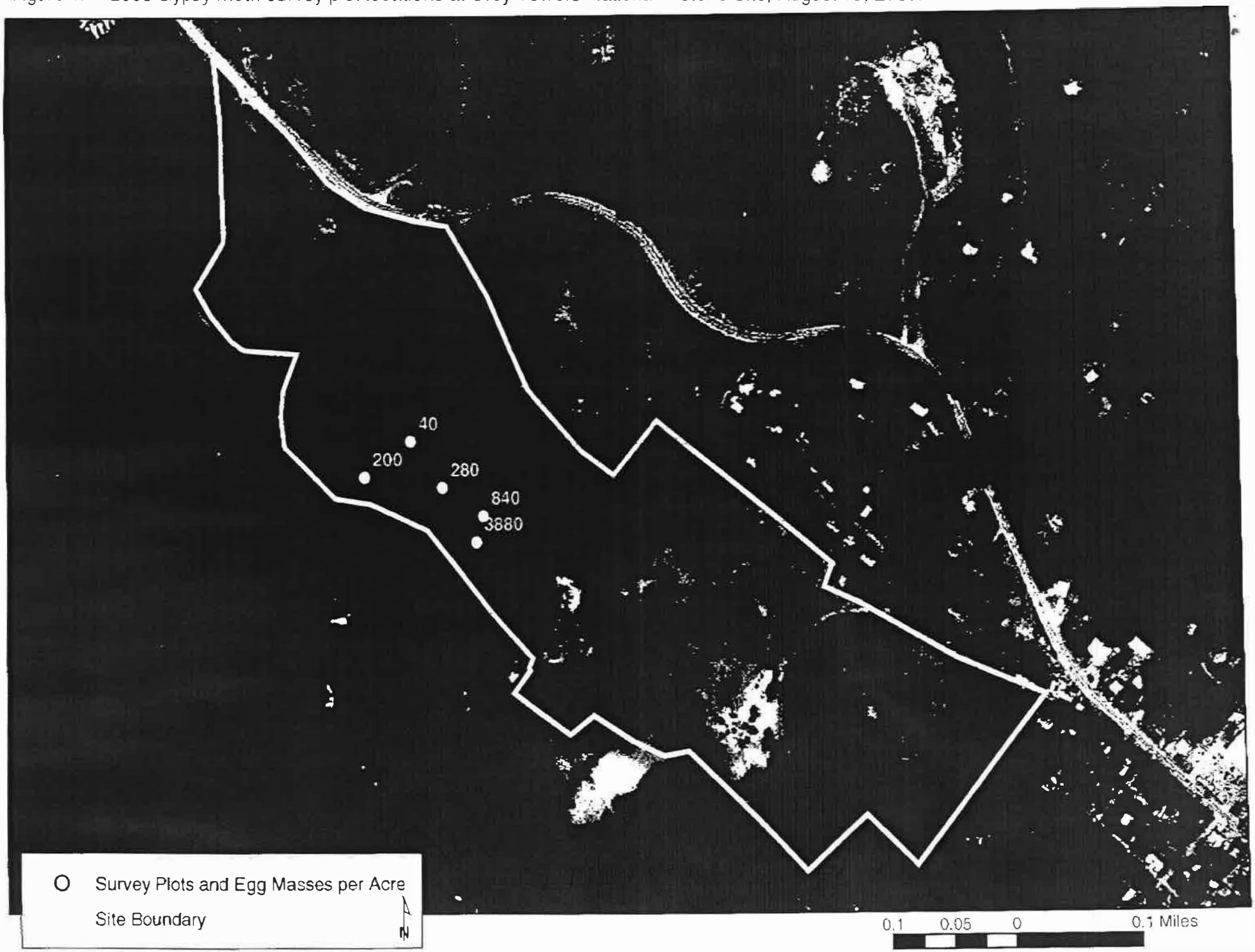
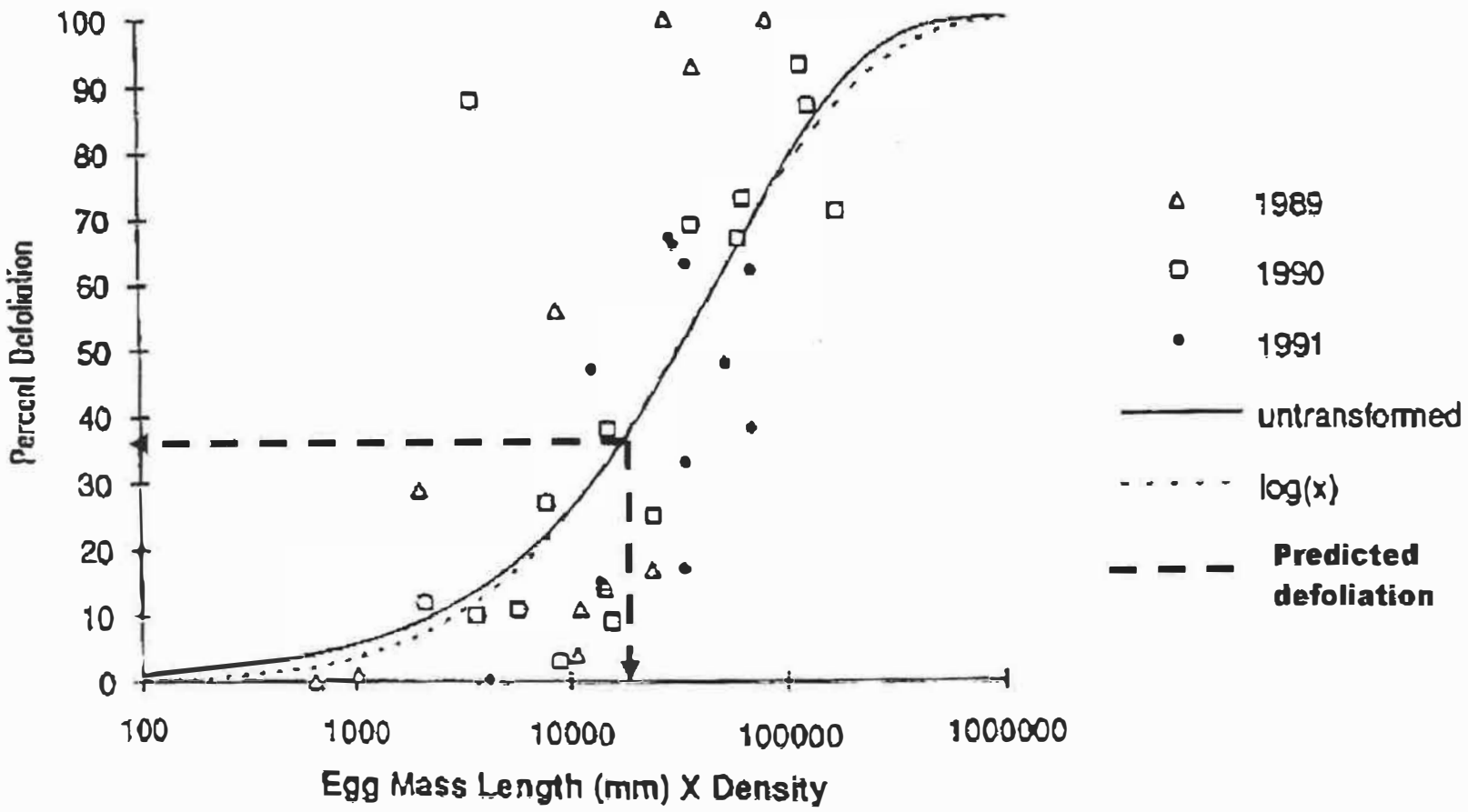


Figure 2.—Predicted defoliation at Grey Towers National Historic Site in 2006.



Scatter plot of the product of mean egg mass length and egg mass density versus mean defoliation. Extracted from Liebhold et al. (1993).